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FACULTY OF COMPUTING AND  
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***“HUMAN COMPUTER INTERACTION”***

***Individual assignment***

***Setby-***

***Bereket Kindie -----NSR/478/13***

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1. Take a look around and select a commonplace product. Can you tell if the design is good or bad? Consider how simple it is to use and whether it successfully satisfies its intended goal.

- Let's analyze a computer mouse a commonplace product to evaluate whether its design is good or bad based on usability, functionality, and its ability to meet its intended goals.

## 1. Intended Goal of a Computer Mouse

The primary purpose of a mouse is to:

- Provide precise cursor control.
- Enable efficient interaction with graphical user interfaces (GUIs).
- Facilitate clicking, scrolling, and additional functions (e.g., shortcuts, gestures).

## 2. Evaluating the Design: Good or Bad?

### A. Ergonomics (Physical Design)

*Good Design*

- Contoured shape fits naturally in the hand, reducing strain.
- Lightweight yet sturdy materials for comfort and durability.
- Textured grips to prevent slipping.

*Bad Design*

- Overly symmetrical shapes (e.g., some ambidextrous mice) that don't fit either hand well.
- Excessively heavy or bulky, causing fatigue.
- Cheap materials that wear out quickly.

### B. Button Layout & Functionality

*Good Design*

- Clearly distinguishable left/right clicks with tactile feedback.
- Scroll wheel with smooth, precise movement (and optionally side-scrolling).
- Additional programmable buttons for power users (e.g., gaming mice).

*Bad Design*

- Stiff or mushy buttons that require excessive force.
- Poorly placed side buttons that lead to accidental clicks.
- Scroll wheel that drifts or lacks responsiveness.

### C. Connectivity & Compatibility

*Good Design*

- Plug-and-play functionality (USB or Bluetooth).
- Reliable wireless connectivity with minimal latency.
- Cross-platform support (Windows, macOS, Linux).

*Bad Design*

- Proprietary dongles that are easily lost.
- Unreliable Bluetooth pairing.
- Drivers that require constant updates or interfere with performance.

### D. Aesthetics & Minimalism

### *Good Design*

- Clean, uncluttered look without unnecessary branding.
- RGB lighting (if present) that can be customized or turned off.

### *Bad Design*

- Overly flashy designs that prioritize looks over comfort.
- Glossy surfaces that attract fingerprints and smudges.

## **3. Usability & User Experience (UX)**

### *Good Design*

- Intuitive—users don't need instructions to operate it.
- Consistent performance across different surfaces (good sensor quality).
- Long battery life (if wireless).

### *Bad Design*

- Requires frequent recharging or battery swaps.
- Poor sensor tracking (skips or jitters).
- Unnecessary software bloat for basic functionality.

## **4. Example Comparison**

### *Logitech MX Master (Good Design)*

- Ergonomic shape, high-precision sensor, customizable buttons, long battery life.

### *Cheap OEM Mouse (Bad Design)*

- Uncomfortable grip, inaccurate tracking, stiff buttons, short-lived switches.

## **5. Psychological & Behavioral Considerations**

### ***A. well-designed mouse should:***

- Reduce cognitive load (users shouldn't think about how to use it).
- Encourage efficiency (fast response, smooth scrolling).
- Prevent strain (poor design leads to repetitive stress injuries).

*2. Choose a software product you use regularly. Evaluate its user interface (UI) based on the following principles: Shneiderman's 8 Golden Rules and Nelson's Heuristic Evaluation Principle*

- ✓ Let's evaluate Microsoft Word a widely used software product using Shneiderman's 8 Golden Rules of Interface Design and Nielsen's 10 Heuristics.

## **Shneiderman's 8 Golden Rules Applied to Microsoft Word**

### ***1. Strive for Consistency***

#### *Good*

- ✓ Consistent layout (Ribbon UI since 2007, similar across Office apps).
- ✓ Standardized icons (e.g., floppy disk for Save, folder for Open).
- ✓ Predictable keyboard shortcuts (Ctrl+S for Save, Ctrl+B for Bold).

#### *Bad*

- ✓ Some inconsistencies in dark/light mode (e.g., some dialog boxes don't adapt).

- ✓ Contextual Ribbon tabs (e.g., "Table Tools") can confuse new users.

## ***2.Enable Frequent Users to Use Shortcuts***

### *Good*

- ✓ Extensive keyboard shortcuts (e.g., Ctrl+Shift+> to increase font size).
- ✓ Quick Access Toolbar (customizable for power users).

### *Bad*

- ✓ Some hidden features require digging into menus (e.g., advanced formatting).
- ✓ No built-in shortcut cheat sheet (users must discover them manually).

## ***3.Offer Informative Feedback***

### *Good*

- ✓ Auto-save status ("Saved" or "Saving..." in the top bar).
- ✓ Spell-check underlines (red for spelling, blue for grammar).

### *Bad*

- ✓ Some actions lack feedback (e.g., no confirmation when deleting a page).
- ✓ Track Changes can be overwhelming with too many annotations.

## ***4.Design Dialogs to Yield Closure***

### *Good*

- ✓ Clear "Save As" dialog with file location confirmation.
- ✓ Undo (Ctrl+Z) provides a sense of reversibility.

### *Bad*

- ✓ Some pop-ups (e.g., "Update Office?") interrupt workflow without clear options.

## ***5.Offer Simple Error Handling***

### *Good*

- ✓ Spell-check suggests corrections.
- ✓ Recovery mode after crashes.

### *Bad*

- ✓ Some errors are vague (e.g., "Formatting error" without explanation).

## ***6.Permit Easy Reversal of Actions***

### *Excellent*

- ✓ Undo (Ctrl+Z) and Redo (Ctrl+Y) work well.
- ✓ Version History allows reverting to older drafts.

## ***7.Support Internal Locus of Control***

### *Good*

- ✓ Users feel in control with customizable Ribbon & Quick Access Toolbar.
- ✓ Options to disable auto-formatting (e.g., turning off "smart quotes").

### *Bad*

- ✓ Auto-correction can be intrusive (e.g., changing "teh" to "the" without asking).

## ***8.Reduce Short-Term Memory Load***

*Good*

- ✓ Recent files list helps users resume work.
- ✓ Ribbon icons provide visual cues.

*Bad*

- ✓ Some advanced features (e.g., mail merge) require memorizing steps.

## **Nielsen's 10 Heuristics Applied to Microsoft Word**

### ***1. Visibility of System Status***

*Good*

- ✓ Progress bar when saving/exporting.
- ✓ Word count at the bottom.

*Bad*

- ✓ No clear indication when syncing to OneDrive.

### ***2. Match Between System & Real World***

*Good*

- ✓ Icons like "Print" (printer symbol) and "Save" (floppy disk) are intuitive.

*Bad*

- ✓ Some icons (e.g., "Styles pane") are abstract.

### ***3. User Control & Freedom***

*Good*

- ✓ Undo/Redo is robust.
- ✓ Escape key cancels actions.

*Bad*

- ✓ Some modal dialogs block other actions (e.g., "Document Recovery").

### ***4. Consistency & Standards***

*Good*

- ✓ Follows Windows/macOS UI conventions.

*Bad*

- ✓ Some inconsistencies in right-click menus.

### ***5. Error Prevention***

*Good*

- ✓ Autosave prevents data loss.
- ✓ Warns before closing unsaved docs.

*Bad*

- ✓ No warning when overwriting files in "Save As."

### ***6. Recognition Rather Than Recall***

*Good*

- ✓ Recent files & templates reduce memory load.

*Bad*

- ✓ Advanced features (e.g., macros) require memorization.

## ***7.Flexibility & Efficiency of Use***

*Good*

- ✓ Customizable Ribbon & Quick Access Toolbar.
- ✓ Keyboard shortcuts for power users.

*Bad*

- ✓ Some repetitive tasks (e.g., table formatting) lack automation.

## ***8.Aesthetic & Minimalist Design***

*Good*

- ✓ Clean Ribbon layout.

*Bad*

- ✓ Some toolbars feel cluttered (e.g., "Review" tab).

## ***9.Help Users Recognize, Diagnose, & Recover from Errors***

*Good*

- ✓ Spell-check suggests fixes.

*Bad*

- ✓ Some error messages are cryptic (e.g., "Compatibility Mode issues").

## ***10.Help & Documentation***

*Good*

- ✓ F1 Help and right-click "Tell me what you want to do" are useful.

*Bad*

- ✓ Some help articles are overly technical.

### ***3. Demonstrate the user interface prototype on question #2's chosen software.***

- ✓ I'll provide a detailed textual walkthrough of a Microsoft Word UI prototype redesign based on the usability issues identified earlier. I'll describe key screens with annotations on improvements, following Shneiderman's 8 Golden Rules and Nielsen's Heuristics.

## **UI Prototype: Microsoft Word Redesign**

**Goal:** Fix inconsistencies, improve discoverability, and reduce cognitive load.

### ***1. Home Screen***

*Current Problem*

- ✓ Overwhelming template gallery; no quick resume for recent files.

*Redesign*

Left Panel

- ✓ "Recent Documents" (pinned + timestamped).
- ✓ "Quick Actions" (New Doc, Open, Scan Text).

#### Right Panel

- ✓ Simplified template categories (e.g., "Work," "Academic").
- ✓ Search bar for templates (Nielsen's #6: Recognition over recall).

#### Heuristics Addressed:

- ✓ #4: Consistency (uniform layout with other Office apps).
- ✓ #8: Minimalist Design (reduced clutter).

## **2. Ribbon UI Customization**

### *Current Problem*

- ✓ Hidden features (e.g., mail merge); excessive tabs.

### *Redesign*

#### Dynamic Ribbon

- ✓ Default view: Core tools (Home, Insert, Review).
- ✓ "Advanced" dropdown (exposes mail merge, macros).

#### Right-Click Context Menu

- ✓ Adds "Format Painter," "Styles" for faster access (Shneiderman's #2: Shortcuts).

#### Visual Notes

- ✓ Icons with text labels (Nielsen's #2: Match to real world).
- ✓ Hover tooltips explain functions (Nielsen's #10: Help).

## **3. Track Changes & Collaboration**

### *Current Problem*

- ✓ Confusing color-coded edits; no summary view.

### *Redesign*

#### Sidebar Panel

- ✓ "Changes Summary" (count of edits/comments).
- ✓ Filter by user/type (e.g., "Show only formatting changes").

#### Color Coding

- ✓ Tooltip explains colors (e.g., "Red: Deletions by John").

#### Heuristics Addressed

- ✓ #1: Visibility of System Status (clear edit tracking).
- ✓ #5: Error Prevention (avoid accidental rejections).

## **4. Save As Dialog**

### *Current Problem*

- ✓ No warning when overwriting files.

### *Redesign*

#### Modal Dialog

- ✓ "A file named 'Report.docx' already exists. Overwrite?" [Yes/No/Save Copy].
- ✓ File preview (Nielsen's #9: Error recovery).

#### Rules Addressed:

- ✓ Shneiderman's #5: Error Handling (explicit confirmation).

## 5. Dark Mode Consistency

### *Current Problem*

- ✓ Some dialogs remain light-themed.

### *Redesign*

#### System-Wide Dark Mode:

- ✓ All pop-ups (e.g., "Font," "Paragraph") adapt to OS theme.
- ✓ Toggle in "Account Settings" (Shneiderman's #1: Consistency).

## 6. Enhanced Help System

### *Current Problem*

- ✓ Help articles are technical.

### *Redesign*

#### Interactive Guide

- ✓ "Walkthroughs" (e.g., "Create a Table of Contents").
- ✓ Video snippets (Nielsen's #10: Help).

### **Key Prototype Takeaways**

1. Reduced Clutter → Prioritized frequent actions.
2. Better Feedback → Clearer save/overwrite prompts.
3. Adaptive UI → Dark mode + customizable ribbon.

*4. Compare and contrast Donald Norman's 7 Principles of Design with Jakob Nielsen's 10 Usability Heuristics. How do these sets of principles overlap, differ, and collectively contribute to the creation of effective and user-centred interfaces? Provide specific examples to illustrate your points.*

✧ Comparison of Norman's 7 Principles vs. Nielsen's 10 Heuristics

Both frameworks aim to improve usability and user experience (UX), but they approach design from slightly different angles:

- ✧ Norman's Principles focus on cognitive psychology (how users perceive and interact with designs).
- ✧ Nielsen's Heuristics are practical guidelines for evaluating interfaces.

### **1. Overlapping Principles**

Norman's Principle	Nielsen's Heuristic	Key Overlap	Example
Visibility	Visibility of System Status	Users should see system actions clearly.	A download progress bar (visibility) shows completion status (system status).
Feedback	Match Between System & Real World	Systems should respond to user actions intuitively.	A "ding" sound when clicking a disabled button (feedback) mimics real-world constraints



			(Nielsen).
Constraints	Error Prevention	Limit user actions to avoid mistakes.	Grayed-out "Submit" button until all form fields are filled (constraints prevent errors).

## 2. Unique Aspects

*Norman's Exclusive Focuses*

### **Affordances**

- ✧ Definition: Visual cues hint at functionality (e.g., a button looks clickable).
- ✧ Example: A 3D-raised button design suggests it can be pressed.

### **Mapping**

- ✧ Definition: Controls should relate logically to their effects.
- ✧ Example: A stove's knobs should align with the correct burner.

### **Conceptual Model**

- ✧ Definition: Users form mental models of how systems work.
- ✧ Example: A trash can icon implies "delete," not "save."

*Nielsen's Exclusive Focuses*

### **User Control & Freedom**

- ✧ Example: "Undo" functionality in Gmail.

### **Consistency & Standards**

- ✧ Example: Using a floppy disk icon for "Save" across apps.

### **Help & Documentation**

- ✧ Example: Tooltips in Photoshop explaining brush settings.

## 3. Key Differences

Aspect	Norman's Principles	Nielsen's Heuristics
Origin	Cognitive psychology (human perception).	Empirical usability research.
Focus	How users understand interfaces.	How to evaluate interfaces.
Application	Early design phase (conceptualization).	Post-design evaluation (testing).
Example Use Case	Deciding button shapes (affordances).	Auditing an app for consistency issues.